

### AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An image capturing apparatus ~~characterized by~~ comprising:

an image capturing section (1) for converting a shape of an object into an electrical quantity in accordance with a parameter value set in a parameter setting section (1a), and outputting image data representing an image corresponding to the shape of the object, said image capturing section comprises:

a detection element (11a) for converting the shape of the object into an analog signal; and

an A/D conversion circuit (14) for converting the analog signal output from said detection element into a digital signal in accordance with the parameter value set in said parameter setting section and outputting the signal as the image data, and the parameter value set in said parameter setting section includes a conversion range and conversion resolution in converting the analog signal into the digital signal; and

a capture control section (3a) for receiving the image data output from said image capturing section, calculating an evaluation index for evaluating image quality of the image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value, wherein the evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value.

2. (Original) An apparatus according to claim 1, wherein when the parameter value set in said parameter setting section is changed, said image capturing section outputs image data obtained by performing conversion again in accordance with the changed parameter value.

Claims 3-11 (Canceled)

12. (Currently Amended) An image capturing method ~~characterized by~~ comprising:

converting a shape of an object into an electrical quantity in accordance with a preset parameter value to generate image data representing an image corresponding to the shape of the object;

calculating an evaluation index for evaluating image quality of the image from the image data; and

changing the parameter value to make the evaluation index fall within a range of a preset reference value,

wherein the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the shape of the object is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a histogram index generated from a histogram representing a density of the image, and the histogram index is a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value.

Claims 13-21 (Canceled)

22. (Currently Amended) A fingerprint collation apparatus ~~characterized by~~ comprising:

an image capturing section (1) for converting a fingerprint ridge/valley pattern into an electrical quantity in accordance with a parameter value set in a parameter setting section (1a), and outputting image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern, said image capturing section comprises:

a detection element (11a) for converting the fingerprint ridge/valley pattern into an analog signal; and

an A/D conversion circuit (14) for converting the analog signal output from said detection element into a digital signal in accordance with the parameter value set in said parameter setting section and outputting the signal as the image data, and the parameter value set in said parameter setting section includes a conversion range and conversion resolution in converting the analog signal into the digital signal;

a capture control section (3a) for receiving the image data output from said image capturing section, calculating an evaluation index for evaluating image quality of the fingerprint ridge/valley pattern image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value; and

collation means for comparing and collating image data output from said capture control section with registered image data prepared in advance, wherein the evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value.

23. (Original) An apparatus according to claim 22, wherein when the parameter value set in said parameter setting section is changed, said image capturing section outputs image data obtained by performing conversion again in accordance with the changed parameter value.

Claims 24-32 (Canceled)

33. (Currently Amended) A fingerprint collation method ~~characterized by~~ comprising:

converting a fingerprint ridge/valley pattern into an electrical quantity in accordance with a preset parameter value to generate image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern;

calculating an evaluation index for evaluating image quality of the image from the image data;

changing the parameter value to make the evaluation index fall within a range of a preset reference value; and

comparing and collating the image data whose evaluation index falls within the range of the reference value with registered image data prepared in advance, wherein the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the fingerprint ridge/valley pattern is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a histogram index generated from a histogram representing a density of the image, and the histogram index is a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value.

Claims 34-43 (Canceled)

44. (New) An image capturing apparatus comprising:

an image capturing section (1) for converting a shape of an object into an electrical quantity in accordance with a parameter value set in a parameter setting section (1a), and outputting image data representing an image corresponding to the shape of the object, said image capturing section comprises:

a detection element (11a) for converting the shape of the object into an analog signal; and

an A/D conversion circuit (14) for converting the analog signal output from said detection element into a digital signal in accordance with the parameter value set in said parameter setting section and outputting the signal as the image data, and the parameter value set in said parameter setting section includes a conversion range and conversion resolution in converting the analog signal into the digital signal; and

a capture control section (3a) for receiving the image data output from said image capturing section, calculating an evaluation index for evaluating image quality of the image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value, wherein the evaluation index calculated by said capture control section is a ridge count index generated on the basis of the number of ridges in the image, and said capture control section obtains an average ridge count in the horizontal direction which is an average ridge count per unit length of the image in the horizontal direction and an average ridge count in the vertical direction which is an average ridge count per unit length of the image in the vertical direction, and calculates a larger one of the average ridge count in the horizontal direction and the average ridge count in the vertical direction as the ridge count index.

45. (New) An apparatus according to claim 44, wherein when the parameter value set in said parameter setting section is changed, said image capturing section outputs image data obtained by performing conversion again in accordance with the changed

parameter value.

46. (New) An image capturing method comprising:

converting a shape of an object into an electrical quantity in accordance with a preset parameter value to generate image data representing an image corresponding to the shape of the object;

calculating an evaluation index for evaluating image quality of the image from the image data; and

changing the parameter value to make the evaluation index fall within a range of a preset reference value,

wherein the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the shape of the object is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a ridge count index generated on the basis of the number of ridges in the image, and the ridge count index is a larger one of an average ridge count per unit length of the image in the horizontal direction and an average ridge count per unit length of the image in the vertical direction.

47. (New) A fingerprint collation apparatus comprising:

an image capturing section (1) for converting a fingerprint ridge/valley pattern into an electrical quantity in accordance with a parameter value set in a parameter setting section (1a), and outputting image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern, said image capturing section comprises:

a detection element (11a) for converting the fingerprint ridge/valley pattern into an analog signal; and

an A/D conversion circuit (14) for converting the analog signal output from said detection element into a digital signal in accordance with the parameter value set in said parameter setting section and outputting the signal as the image data, and the parameter value set in said parameter setting section includes a conversion range

and conversion resolution in converting the analog signal into the digital signal;

a capture control section (3a) for receiving the image data output from said image capturing section, calculating an evaluation index for evaluating image quality of the fingerprint ridge/valley pattern image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value; and

collation means for comparing and collating image data output from said capture control section with registered image data prepared in advance, wherein the evaluation index calculated by said capture control section is a ridge count index generated on the basis of the number of ridges in the image, and said capture control section obtains an average ridge count in the horizontal direction which is an average ridge count per unit length of the image in the horizontal direction and an average ridge count in the vertical direction which is an average ridge count per unit length of the image in the vertical direction, and calculates a larger one of the average ridge count in the horizontal direction and the average ridge count in the vertical direction as the ridge count index.

48. (New) An apparatus according to claim 47, wherein when the parameter value set in said parameter setting section is changed, said image capturing section outputs image data obtained by performing conversion again in accordance with the changed parameter value.

49. (New) An apparatus according to claim 47, wherein

said apparatus further comprises a finger resting detection section for detecting that a finger is rested on said image capturing section, and

when said finger resting detection section detects that the finger is rested on said image capturing section, said image capturing section converts a fingerprint ridge/valley pattern into an electrical amount in accordance with a parameter set in

said parameter setting section, and outputting image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern.

50. (New) An apparatus according to claim 22, wherein  
said apparatus further comprises a finger resting detection section for detecting that a finger is rested on said image capturing section, and  
when said finger resting detection section detects that the finger is rested on said image capturing section, said image capturing section converts a fingerprint ridge/valley pattern into an electrical amount in accordance with a parameter set in said parameter setting section, and outputting image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern.

51. (New) A fingerprint collation method comprising:  
converting a fingerprint ridge/valley pattern into an electrical quantity in accordance with a preset parameter value to generate image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern;  
calculating an evaluation index for evaluating image quality of the image from the image data;  
changing the parameter value to make the evaluation index fall within a range of a preset reference value; and  
comparing and collating the image data whose evaluation index falls within the range of the reference value with registered image data prepared in advance, wherein the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the fingerprint ridge/valley pattern is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a ridge count index generated on the basis of the number of ridges in the image, the ridge count index is a larger one of an average ridge count per unit length of the image in the horizontal direction and an average ridge count per unit length of the image in the vertical direction.